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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/652,674	08/29/2003	Nir Sasson	TI-33781	2542

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EXAMINER	
TORRES, JUAN A	
ART UNIT	**PAPER NUMBER**
2611	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	01/17/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/652,674	SASSON ET AL.	
	Examiner	Art Unit	
	Juan A. Torres	2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *29 August 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-15* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-15* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *29 August 2003* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Drawings

The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference character "10" has been used to designate both figure 1 and a multiplier in figure 2.

The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference character(s) not mentioned in the description: "1", "2", "10" and "12" in figure 2.

Corrected drawing sheets in compliance with 37 CFR 1.121(d), or amendment to the specification to add the reference character(s) in the description in compliance with 37 CFR 1.121(b) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

The disclosure is objected to because of the following informalities:

a) In page 1 last paragraph the recitation "WLAN" is improper, because this term has not been introduced previously; it is suggested to be changed to "Wireless Local Area Network (WLAN)".

b) In page 6 the recitation "where $\theta << 1$ is the phase error and $A \approx 1$ is the gain error" is not understood where A is disclosed in the previous equations (emphasis added).

Appropriate correction is required.

Claim Objections

Claims 12-14 are objected to because of the following informalities:

As per claim 12, the recitation lines 1-2 of claim 12 "wherein the means means responsive" is improper, because it is not properly constructed; it is suggested to be changed to "wherein the means responsive".

As per claim 12, the recitation line 2 of claim 12 "a estimated" is improper, because it is not properly constructed; it is suggested to be changed to "an estimated".

As per claim 13, the recitation line 2 of claim 13 "a estimated" is improper, because it is not properly constructed; it is suggested to be changed to "an estimated".

As per claims 13 and 14, they are rejected because they depend directly or indirectly from claim 12 and claim 12 is a rejected claim.

Appropriate correction is required.

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claim 15 rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. Claim 15 claims algorithmic software that at the best that can be interpreted by the specification, is an abstract idea under the non-statutory subject of matter of a computer software code.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 15 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 15 is an apparatus claims, but it claims algorithmic software, that doesn't define any structure. MPEP in section 2114 states that "[A]pparatus claims cover what a device *is*, not what a device *does*." Hewlett-Packard Co. v. Bausch & Lomb Inc., 909 F.2d 1464, 1469, 15 USPQ2d 1525, 1528 (Fed. Cir. 1990) (emphasis in original)". And also that "While features of an apparatus may be recited either structurally or functionally, claims directed to an apparatus must be distinguished from the prior art in terms of structure rather than function. In re Schreiber, 128 F.3d 1473, 1477-78, 44 USPQ2d 1429, 1431-32 (Fed. Cir. 1997)".

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 7 and 15 are rejected under 35 U.S.C. 102(b) as being anticipated by Mohindra (WO 200225846 A).

As per claim 7, Mohindra discloses a up/down conversion transceiver comprising a receiver operating at a local oscillator frequency (abstract, figure 1 block 2 page 3 line 20 to page 5 line 2); and a transmitter operating at the local oscillator frequency, wherein the receiver and transmitter, independently of one another, are each configured to cancel its respective gain and phase impairments (abstract, figure 1 block 3 page 3 line 20 to page 5 line 2).

As per claim 15, Mohindra discloses a up/down conversion transceiver comprising a receiver operating at a local oscillator frequency (abstract, figure 1 block 2 page 3 line 20 to page 5 line 2); a transmitter operating at the local oscillator frequency (abstract, figure 1 block 3 page 3 line 20 to page 5 line 2); and algorithmic software, wherein the receiver and transmitter operate independently of one another in response to the algorithmic software such that the receiver and transmitter each cancel only its respective gain and phase imbalances (abstract, figure 1 page 3 line 20 to page 5 line 2).

Claims 7 and 15 are rejected under 35 U.S.C. 102(a) as being anticipated by Landing (EP 1298791 A1).

As per claim 7, Landing discloses a up/down conversion transceiver comprising a receiver operating at a local oscillator frequency (figures 1b, 2 and 6a paragraphs [0046]-[0072]); and a transmitter operating at the local oscillator frequency, wherein the receiver and transmitter, independently of one another, are each configured to cancel its respective gain and phase impairments (figures 1a, 3 and 5a paragraphs [0046]-[0072]).

As per claim 15, Landing discloses a up/down conversion transceiver comprising a receiver operating at a local oscillator frequency (figures 1b, 2 and 6a paragraphs [0046]-[0072]); a transmitter operating at the local oscillator frequency (figures 1a, 3 and 5a paragraphs [0046]-[0072]); and algorithmic software, wherein the receiver and transmitter operate independently of one another in response to the algorithmic software such that the receiver and transmitter each cancel only its respective gain and phase imbalances (figures 1a, 1b, 2, 3, 6a and 6b paragraphs [0046]-[0072]).

Claims 1-15 are rejected under 35 U.S.C. 102(e) as being anticipated by Chien (US 20040203472 A1).

As per claim 1, Chien discloses estimating gain and phase imbalance parameters in receive mode during transceiver power-up (figure 10 block s1006 paragraph [0105]); canceling the receive mode gain and phase imbalance in response to the estimated parameters (figure 10 block s1010 and figures 12A and 12B paragraphs [0105]-[0109]); switching the transceiver to transmit mode subsequent to cancellation of the receiver gain and phase imbalance (figure 10 block s1012 and

figures 13A and 13B paragraphs [0110]-[0112]); transmitting a signal back into the receiver via the transceiver transmitter subsequent to switching to the transmit mode (figure 10 blocks s1012 and s1010 RX line and figures 12A and 12B paragraphs [0105]-[0109]); re-estimating gain and phase imbalance parameters subsequent to transmission of the signal back into the receiver (figure 10 block s1010 and figures 12A and 12B paragraphs [0105]-[0109]), and generating transmit mode gain and phase impairments there from (figure 10 block s1012 and figures 13A and 13B paragraphs [0110]-[0112]); and canceling transmit mode gain and phase imbalance in response to the estimated impairments (figure 10 block s1012 and figures 13A and 13B paragraphs [0110]-[0112]).

As per claim 2, Chien discloses claim 1, Chien also discloses that the receive mode gain and phase parameters are selectively estimated in response to amplified noise or an external test signal (figure 9 and figure 10 block s1006 paragraphs [0100]-[0105]; figure 9 block S918] and paragraph [0102] specifically discloses the test signal).

As per claim 3, Chien discloses claim 1, Chien also discloses that the receive mode gain and phase parameters are selectively estimated in response to a received passband input signal.

As per claim 4, Chien discloses claim 1, Chien also discloses that the receive mode gain and phase imbalance is canceled in a feed forward manner (figures 33-38B paragraphs [0253]-[0258]).

As per claim 5, Chien discloses an analog down converter operational in association with a plurality of A/D converters to generate in-phase signals and

quadrature signals in response to passband RF input signals (figure 7 blocks 710, 712, 722 and 724 paragraphs [0082]-[0086]); a digital gain equalizer operational in response to the in-phase and quadrature signals to cancel a estimated receive gain error when the transceiver is in receive mode and further operational to estimate a transmit gain error when the transceiver is in transmit mode (figure 7 blocks 728 and 740; paragraphs [0083]-[0084]; figures 16A and 16B for the receiver and figures 17A and 17B for the transmitter multiplier in the Q channel paragraphs [0122]-[0164]); a digital phase estimator operational in response to the in-phase and quadrature signals to generate a estimated receive phase error when the transceiver is in receive mode and further operational to estimate a transmit phase error when the transceiver is in transmit mode (figure 7 blocks 726 and 776; paragraph [0083]; figures 19-27 paragraphs [0129]-[0183]); a receiver digital phase equalizer operational to cancel the estimated receive phase error (figure 7 blocks 728 and 740; paragraphs [0083]-[0084]; figures 16A and 16B for the receiver and figures 17A and 17B for the transmitter adder in the I channel paragraphs [0122]-[0164]); and a transmitter operational to generate up-converted passband RF input signals having canceled transmit gain and phase imbalances in response to the passband RF input signal, the estimated transmit gain error and the transmit phase error (figure 7 blocks 740, 776, 774, 742, 756 and 758 paragraphs [0082]-[0086]).

As per claim 6, Chien discloses claim 5, Chien also discloses that receive and transmit portions of the transceiver are configured to operate with the same local oscillator frequency and are further configured to operate with independent phase and

gain impairments (figure 7 block 764; blocks 726, 730 and 728 for the receiver and blocks 776, 774 and 742 for the transmitter paragraphs [0082]-[0086]).

As per claim 7, Chien discloses a up/down conversion transceiver comprising a receiver operating at a local oscillator frequency (abstract, paragraphs [0020]-[0027]; figure 7 receiver part paragraphs [0082]-[0086]; and [0088]-[0099]); and a transmitter operating at the local oscillator frequency, wherein the receiver and transmitter, independently of one another, are each configured to cancel its respective gain and phase impairments (abstract, paragraphs [0020]-[0027]; figure 7 transmitter part paragraphs [0082]-[0086]; and [0088]-[0099]).

As per claim 8, Chien discloses claim 7, Chien also discloses an analog down converter operational in association with a plurality of A/D converters to generate in-phase signals and quadrature signals in response to passband RF input signals (figure 7 blocks 710, 712, 722 and 724 paragraphs [0082]-[0086]); a digital gain equalizer operational in response to the in-phase and quadrature signals to cancel a estimated receive gain error when the transceiver is in receive mode and further operational to estimate a transmit gain error when the transceiver is in transmit mode (figure 7 blocks 728 and 740; paragraphs [0083]-[0084]; figures 16A and 16B for the receiver and figures 17A and 17B for the transmitter multiplier in the Q channel paragraphs [0122]-[0164]); a digital phase estimator operational in response to the in-phase and quadrature signals to generate a estimated receive phase error when the transceiver is in receive mode and further operational to estimate a transmit phase error when the transceiver is in transmit mode (figure 7 blocks 726 and 776; paragraph [0083]; figures

19-27 paragraphs [0129]-[0183]); and a receiver digital phase equalizer operational to cancel the estimated receive phase error (figure 7 blocks 728 and 740; paragraphs [0083]-[0084]; figures 16A and 16B for the receiver and figures 17A and 17B for the transmitter adder in the I channel paragraphs [0122]-[0164]).

As per claim 9, Chien discloses claim 8, Chien also discloses that the transmitter is operational to generate up-converted passband RF input signals having canceled transmit gain and phase imbalances in response to the passband RF input signal, the estimated transmit gain error and the transmit phase error (figure 7 blocks 740, 776, 774, 742, 756 and 758 paragraphs [0082]-[0086]).

As per claim 10, Chien discloses claim 7, Chien also discloses means for generating in-phase signals and quadrature signals in response to passband RF input signals (figure 7 blocks 710, 712, 722 and 724 paragraphs [0082]-[0086]); means responsive to the in-phase and quadrature signals for canceling a estimated receive gain error when the transceiver is in receive mode and for estimating a transmit gain error when the transceiver is in transmit mode (figure 7 blocks 728 and 740; paragraphs [0083]-[0084]; figures 16A and 16B for the receiver and figures 17A and 17B for the transmitter multiplier in the Q channel paragraphs [0122]-[0164]); means responsive to the in-phase and quadrature signals for generating a estimated receive phase error when the transceiver is in receive mode and for estimating a transmit phase error when the transceiver is in transmit mode (figure 7 blocks 726 and 776; paragraph [0083]; figures 19-27 paragraphs [0129]-[0183]); and means for canceling the estimated receive phase error (figure 7 blocks 728 and 740; paragraphs [0083]-[0084]; figures 16A and

16B for the receiver and figures 17A and 17B for the transmitter adder in the I channel paragraphs [0122]-[0164]).

As per claim 11, Chien discloses claim 10, Chien also discloses that the means for generating in-phase signals and quadrature signals comprises an analog down converter operational in association with a plurality of A/D converters (figure 7 blocks 710, 712, 722 and 724 paragraphs [0082]-[0086]).

As per claim 12, Chien discloses claim 11, Chien also discloses that the means responsive to the in-phase and quadrature signals for canceling an estimated receive gain error comprises a digital gain equalizer (figure 7 blocks 728 and 740; paragraphs [0083]-[0084]; figures 16A and 16B for the receiver and figures 17A and 17B for the transmitter multiplier in the Q channel paragraphs [0122]-[0164]).

As per claim 13, Chien discloses claim 12, Chien also discloses the means responsive to the in-phase and quadrature signals to generate a estimated receive phase error comprises a digital phase estimator (figure 7 blocks 726 and 776; paragraph [0083]; figures 19-27 paragraphs [0129]-[0183]).

As per claim 14, Chien discloses claim 13, Chien also discloses that the means for canceling the estimated receive phase error comprises a receiver digital phase equalizer (figure 7 blocks 728 and 740; paragraphs [0083]-[0084]; figures 16A and 16B for the receiver and figures 17A and 17B for the transmitter adder in the I channel paragraphs [0122]-[0164]).

As per claim 15, Chien discloses a up/down conversion transceiver comprising a receiver operating at a local oscillator frequency (abstract, paragraphs [0020]-[0027];

figure 7 receiver part paragraphs [0082]-[0086]; and [0088]-[0099]); a transmitter operating at the local oscillator frequency (abstract, paragraphs [0020]-[0027]; figure 7 transmitter part paragraphs [0082]-[0086]; and [0088]-[0099]); and algorithmic software, wherein the receiver and transmitter operate independently of one another in response to the algorithmic software such that the receiver and transmitter each cancel only its respective gain and phase imbalances (abstract, paragraphs [0020]-[0027]; figure 7 paragraphs [0082]-[0086]; and [0088]-[0099]).

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Smith (US 5444864 A) discloses generating a cancellation signal that is a gain and phase matched estimate of a leak-through signal generated by an interfering transmitter. Ferry (US 20040151237 A1) discloses removing the effects of phase and amplitude distortions from data signals. Kv Kumar (US 20040202236 A1) discloses estimating gain and phase imbalance in upconverting transmitters that transmit each symbol as multiple vector components. Hamalainen (US 20040266360 A1) discloses a method for forming signals at a transceiver having at least two transmit and receive chain, the method comprising the steps of determining the phase difference and relative amplitude of signals from a set comprising a plurality of mobile stations as received through the receive chains; receiving from each of at least one of the mobile stations messages indicative of the strength or quality of signals as received by the respective mobile station from the transceiver and on the basis of those messages determining a phase offset and amplitude distortion, internal to the transceiver, resulting

from the differences in the instrumental properties of the receiver and transmitter chains in the transceiver; and transmitting signals from each of the transmitter chains by applying to each transmitter chain amplitude weights and signal delays, selected on the basis of the determined phase offset and amplitude distortion, and received relative amplitudes and phase differences.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Juan A. Torres whose telephone number is (571) 272-3119. The examiner can normally be reached on Monday-Friday 9:00 AM - 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mohammad H. Ghayour can be reached on (571) 272-3021. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Juan Alberto Torres
10-04-2006